

5.3 WATER RESOURCES

Potential effects to water resources were evaluated with respect to groundwater, surface water, stormwater runoff, potable/process water, and wastewater. The potential activities being considered under Alternatives 2, 3 and 4 could affect portions of three ORR watersheds: Bethel Valley, Melton Valley, and Upper East Fork Poplar Creek (UEFPC). None of the potential construction, remodeling, relocation or other potential activities would include direct withdrawal from the existing surface or groundwater resources. Some redundancy in major utility lines, including potable/process water supply lines, would be implemented in all alternatives, but primarily in Alternative 4. Because all facilities to be remodeled, constructed or deactivated would be served by the same potable water supply system, there should be little- to-no long-term net increase in water consumption under any of the alternatives. In fact, long-term reductions in potable/process water usage could occur from utility improvement/remodeling that reduce leakage.

5.3.1 Alternative 1 – No Action

Alternative 1 - No Action would involve no remodeling or FRP construction activities, and no facilities would be deactivated. Short-term effects are not anticipated. Long-term effects are likely. Use of aging potable/process water supply lines could result in increased water consumption and flushing of additional contaminants from soils into shallow groundwater and nearby surface waters, particularly in the Y-12 facilities occupied by ORNL. Undetected future failures or releases from deteriorating contaminated structures or buried piping could increase contaminant discharge to groundwater and surface water.

5.3.2 Alternative 2 – Remodel

Alternative 2 could result in some short-term effects resulting from remodeling activities and associated utility upgrades in the potable/process water and wastewater lines servicing the affected facilities. Alternative 2 should not require interruption of active sumps (e.g., basement of Building 4500N) or cause new or additional discharges to surface water. Remodeling should result in a long-term reduction in potable/chilled water and steam use due to more efficient facility insulation and heating/cooling systems. Upgrading of utility lines should also result in a reduction in water usage by reducing the potential for leaks from aging/failing waste conveyance systems.

5.3.3 Alternative 3 – Brownfield

Alternative 3 would include the potential effects described above for Alternative 2 and additional effects that could be associated with the new construction. The construction activities planned for FY01 through FY07 would result in disturbances to surface areas in Bethel Valley. Inadvertent breakage or temporary rerouting of sewer lines could result in releases to groundwater or surface water. Both Alternatives 3 and 4 could affect the surrounding water resources as a result of new construction, a change in ongoing operations (e.g., altering drains or sumps), or from short- or long-term maintenance of buildings placed in a “cheap-to-keep” mode.

New discharges, in the form of stormwater runoff (i.e., sheet runoff, overland flow, or NPDES outfalls) could occur in association with new construction, facility remodeling, and long-term operations. This could result in increased sediment load to receiving surface water bodies (primarily White Oak Creek and White Oak Lake) or to the liquid waste treatment plants, if erosion control measures were not properly implemented. If flow rates in the receiving streams were to increase, it could result in stream-bed erosion and mobilization of contaminants in the sediments (e.g., mercury, ^{90}Sr , ^{137}Cs , ^{60}Co). However, the phased progression of activity over periods of several years would tend to reduce these short-term impacts because the area being disturbed during any given time period would be small. It is assumed that the stormwater and aquatic-resource alteration control measures required by the State of Tennessee would be implemented to mitigate these disturbances.

Several buildings that are to be deactivated at Y-12 have been identified as contaminant source areas for shallow groundwater and surface water in UEFPC. Placement of these facilities in “cheap to keep” mode would not result in a disruption of sumps that currently prevent contaminant discharge directly to groundwater or surface water.

Relocation of employees from Y-12 to Bethel Valley would have little noticeable impact to potable water supplies because the same water supply plant serves all facilities. Based on a relocation of approximately 540 employees to Bethel Valley and a per capita waste generation of 95 liters per day (LPD) [25 gallons per day (GPD)], the increased load to waste treatment facilities in Bethel Valley would be less than 52,996 LPD (14,000 GPD) which should not negatively impact current operations.

New FRP construction would also require construction and connection of new potable/process, storm, and wastewater piping that could provide new sub-grade migration pathways for contaminants in nearby areas. However, the buildings and sites proposed for remodeling or new construction would be out of known contaminated areas within Bethel Valley.

5.3.4 Alternative 4 – Greenfield

Implementation of Alternative 4 would include all effects described above for Alternative 2 and most of those for Alternative 3. Construction of FRP facilities on the Greenfield Site would result in disturbance of approximately 18 ha (45 acres) in Bethel Valley. It is assumed that the stormwater control measures required by the State of Tennessee would be implemented for all disturbed areas. Surface water runoff from the Greenfield Site would enter the upper reaches of White Oak Creek and flow downstream past the existing facilities. As discussed for Alternative 3, any increases in flow rates in the receiving stream could potentially result in stream-bed erosion and mobilization of any contaminants in the sediments (e.g., mercury, ^{90}Sr , ^{137}Cs , ^{60}Co). However, disturbance of soils at the Greenfield Site should not contaminate surface water or shallow groundwater because the soil is not contaminated.

The extensive site preparation activities required to implement Alternative 4 would require robust erosion control measures to prevent stream sedimentation. Similarly, stormwater controls and approximately 457 linear meters (LM) [1,500 linear feet (LF)] of new stormwater piping and drains would be required. A sedimentation basin could be required during construction.

As with Alternative 3, placement of the Y-12 facilities in “cheap to keep” mode would not result in disruption of sumps that currently prevent contaminant discharge directly to groundwater or surface water. Therefore, no additional effects would be expected from deactivating facilities.